Delaware Spatial Data Framework

2002 Annual Report

The Delaware Spatial Data Implementation Team (I-Team)

Overview

Delaware's Spatial Data Framework has been complete and generally available since 2000. Delaware's Framework data sets are all at a scale of at least 1:24,000. The Framework data sets present spatial data to provide a base map that includes nine basic framework areas of information:

OrthoImagery	Land Use/Land Cover	Elevation
Geodetic Control	Geographic Names	Water Features
Cadastre/Parcels	Governmental Units	Transportation

The work of the Delaware Spatial Data Implementation Team (I-Team) in the last several years has been to refine and update the Framework on an on-going basis. Because the Framework pre-dates the I-Team, the I-Team has not developed a Strategic Plan to complete the Framework, as other states have done. Instead, the I-Team provides an annual update to the Governor on maintenance of the Framework.

In 2002, there have been major enhancements in the Cadastral data sets of the Framework and in the availability and sharing of cadastral data. Although Sussex County's newly updated cadastral data was not officially publicly available, it was possible by the end of the year to use cadastral data on a statewide basis.

Also in 2002, the advent of the Delaware Data Mapping and Integration Laboratory (DataMIL) and improvements in the Delaware Spatial Data Clearinghouse have enhanced the ability to share and publish Delaware Framework data. Except where noted, data sets listed as being available on the Delaware DataMIL are available for on-line browsing, as ArcIMS (OpenGIS-compliant) map services, and for download, either in whole or in part. DataMIL implementation has also led to needed discussions of Data publication in Delaware and to examination of practices and policies that may need to be changed.

Looking forward, in 2003, the Delaware Spatial Data Implementation Team (I-Team) will continue to fine tune the Framework data sets and the sharing of those data sets. The I-Team will continue to push for a truly distributed data sharing and maintenance regime.

OrthoImagery

Existing Imagery

Delaware's existing orthimagery was collected in 1997. The state is in the process of transition between its existing orthimagery product and a new, higher-resolution, higher scale data set collected in 2002. The new data is expected to be fully available in the first part of 2003.

The 1997 orthoimagery is published at a map scale of 1:12,000. Each pixel in the data set represents approximately one square meter. This data is available as a collection 172 GeoTIFF files with associated world files on a collection of 16 CD-ROM discs. Each GeoTIFF file represents a "quarter quad" tile, based on the old USGS quadrangle-based system of organizing map data. The 1997 imagery has also been compressed into three county-wide MrSID files; available on one CD-ROM. Metadata is published on the Delaware Spatial Data Clearinghouse.

The 1997 imagery is available on-line in a simplified form (3-meter pixels) from the University of Delaware's Spatial Analysis Lab (*www.udel.edu/FREC/spatlab*) as are simplified versions of earlier statewide orthoimagery projects.

The 1997 imagery is available on-line in its full resolution on the Delaware DataMIL (*datamil.udel.edu*). The 1997 imagery is also available for browsing on the Department of Natural Resources and Environmental Control (DNREC) Environmental Navigator (*www.dnrec.state.de.us/DNRECeis*) and the SmartMap web site of Thompson Mapping (*www.smartmap.com*), which provides GIS and mapping services for several local Delaware governments.

New Imagery

The 2002 Statewide OrthoImagery was collected in March and April of 2002 as one of the first major projects of the Delaware I-Team. Funding for the project was put together from the Delaware Department of Transportation (DelDOT), DNREC, The Office of State Planning Coordination (OSPC) and New Castle County government.

The 2002 orthoimagery will be published, beginning in January 2003, at a map scale of 1:2,400. Each pixel in the data set will represent approximately one square foot. The new imagery will be delivered as a collection of nearly 2,000 GeoTIFF files with associated world files. The data will also be delivered as compressed MrSID files, likely clipped by county or other geography selected based on compression ratio and file size. Metadata will be published on the Delaware Spatial Data Clearinghouse.

The 2002 orthoimagery will be made available for viewing and download via a variety of avenues. These will include the Delaware DataMIL and on-demand download, as well as some custom delivery of parts of the data set. Availability may also include the DNREC Environmental Navigator and sites such as the Thompson Mapping SmartMap Sites.

Future Considerations

The I-Team will need to decide in 2003 whether to pursue a next round of orthoimagery in 2007. This would provide a five-year refresh cycle, as envisioned by the I-Team in planning for the 2002 orthoimagery. The Professional Services Agreement negotiated for the 2002 project provides for possible updates in at least 2005, but these are predicated on funding availability, which may be a problem. Data collection in spring of 2007 would need to be budgeted for in the Fiscal Year 2006 budget.

Budgetary concerns may be off-set buy the possibility of moving to using digital camera technology for the next update, which could mean cost-savings. Cost-savings are also likely to accrue from the imagery infrastructure (i.e. control points) built-up in the 2002 project.

Geodetic Control

Existing Data

Delaware uses the High Accuracy Reference Network (HARN), which is maintained by the National Geodetic Survey (NGS). The NGS State Advisor Liaison for Delaware is Mark Eckl, who is based in Silver Spring, Maryland. The local contact is the Delaware Geological Survey. The HARN data is available on the Delaware DataMIL. Metadata is published on the Delaware Spatial Data Clearinghouse.

Future Considerations

If this data set is to remain a part of the Delaware Framework, it may be useful for the I-Team to explore ways to integrate the HARN network data with "less accurate" monumentation data, such as that established for the 2002 orthoimagery project. This will require close coordination with the professional community of Delaware Surveyors. The DGS made several attempts to make contact with this community in 2002; so far, with little success.

Cadastre / Parcels

Existing Data

Cadastral data in Delaware is maintained by the three counties at varied scales and using differing standards, at this point. Discussions are underway by a Working Group of county GIS leaders to establish statewide standards.

Generally speaking, cadastral data sets in Delaware are accurate to a scale of at least 1:12,000. They generally are matched to the 1997 orthoimagery (at a scale of 1:12,000). It is anticipated that the 2002 orthoimagery will allow county GIS managers to bring their cadastral data closer to 1:2,400.

As of the end of 2002, only the New Castle County cadastral data set is available via the Delaware DataMIL. Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse. New Castle County also publishes

cadastral data on an ArcIMS web page linked to the County Planning Department web page (*www.co.new-castle.de.us/ ParcelView/parcelsearch.asp*). New Castle County cadastral data is also available by request from the County.

Kent County cadastral data is available for viewing on the SmartMap web site maintained for the County by Thompson Mapping (*www.smartmap.com/ kent_co*). It will be added in early 2003 to the Delaware DataMIL. Metadata for this data set will be published on the Delaware Spatial Data Clearinghouse. Kent County cadastral data is also available by request from the County.

Sussex County officially published its cadastral data in January 2003. Draft versions have been available by special request from the County for much of 2002. Sussex County has made its cadastral data available for viewing on a SmartMap web site (*www.smartmap.com/sussex*) maintained for the County by Thompson Mapping. This data set will be posted on the Delaware DataMIL in early 2003. Metadata for this data set will be published on the Delaware Spatial Data Clearinghouse.

Future Considerations

As noted above, the DataMIL team will add both Kent and Sussex parcel data to the DataMIL site in early 2003. In addition, the I-Team will work with all three counties to provide other map services and OpenGIS-compliant map services to provide access to this data. This effort should also include data download sites for high-end GIS users.

The County Cadastral Working Group has begun discussions toward a statewide Cadastral Data Standard for Delaware. This will likely be based on national standards, but customized for Delaware use. This group is also working with 6he Delaware Department of Transportation and the I-Team to consider ways to integrate cadastral and transportation data (See Transportation 1, below).

Land Use / Land Cover (LULC)

Existing Data

The Delaware Framework uses land use/land cover data derived from the 1997 orthoimagery. Creation of this data was funded by contributions from state agencies represented on the Cabinet Committee for State Planning Issues, including DNREC, DelDOT and the Delaware Economic Development Office. Previous LULC data sets were collected in 1984 and 1992.

This data set is at a scale of 1:12,000 and comprises polygons having land use/land cover codes from the *Anderson et al* classification system. The LULC data set is published by the Office of State Planning Coordination (OSPC) and is available on-line on the Delaware DataMIL and for on-demand download from the OSPC web site (*www.state.de.us/planning/info/lulcdata*). Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse. The

LULC data is also available for on-line viewing on several of Thompson Mapping's SmartMap web sites.

2002 Update

A new LULC data set will be derived from the 2002 orthoimagery as part of the 2002 orthoimagery project described above. The data set is expected to be available by the end of June 2003.

This data set will be at a scale of 1:2,400 and will comprise a series of polygons with land use/land cover codes from the *Anderson et al* classification system. The 2002 LULC data set will be published by the Office of State Planning Coordination (OSPC) and will be available on-line on the Delaware DataMIL and for on-demand download from the OSPC web site. Metadata for this data set will be published on the Delaware Spatial Data Clearinghouse.

Future Considerations

Previous LULC data sets have been maintained as static snapshots. The I-Team may want to consider approaches that would allow on-going, partial updates of the data sets, perhaps by creating closer ties to the county cadastral data sets.

Geographic Names

Existing Data

The Delaware Framework makes use of the existing Geographic Names Information System (GNIS) as maintained by the USGS. The GNIS data set is related to the labeling on the existing USGS Topographic Map series.

GNIS data is available on-line on the Delaware DataMIL and from the USGS GNIS web site (*geonames.usgs.gov*). Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse.

Future Considerations

Because the GNIS began life, and continues an important function as, a labeling data set for the Topographic Map series, it has certain limitations as a GIS data set. The GNIS has impressive attribute information, but uses only label-point information to denote geographic location. In addition, the label-point information may be duplicative, to allow for labeling of large geographic features over many map sheets.

The Delaware I-Team has an interest in finding ways to translate the GNIS data, for Delaware, from a label-point data set to a true attribute data set for existing spatial features. The GNIS managers at USGS have expressed an interest in using the DataMIL project to test out several approaches to this sort of change. For example, the GNIS has suggested using the newly created Delaware Schools data set to both update GNIS, on a national level, and replace GNIS, at a local level.

In addition, there is a need to augment the GNIS to provide names for many features that are not yet available in the GNIS system, such as new subdivisions.

Governmental Units 1: State / County Boundaries

Existing Data

The Delaware Framework uses USGS state and county boundary lines from the Digital Line Graph (DLG) data set. The DLG data is taken from the graphic data product of the USGS Topographic Map series. It is at a scale of 1:24,000 and is available on the Delaware DataMIL and through an USGS anonymous FTP site (*ftp://mcsol10.er.usgs.gov/pub/datamil*). Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse.

Future Considerations

The legal Delaware state boundary is described in state law (29 Delaware Code, §201) and is subject to oversight by the State Boundary Commission (29 Delaware Code, §202(c)). It should always be made clear that the GIS representation of the state boundary is not intended to replace the legal description of the boundary. There are several issues with the representation of the boundary that should be addressed by the I-Team, in conjunction with the State Boundary Commission.

First, the boundary should align to the locations of 179 historic monuments that mark portions of the actual state boundary. The DLG data set comes close, but will need to be adjusted to more precisely match the monuments.

Second, parts of the state boundary tend to diverge from what the public thinks of as the outline of the state. The boundary runs along parts of the New Jersey shoreline of the Delaware River, down the Center of the Delaware Bay, and into the Atlantic Ocean, while people envision the shorelines of the River, Bay and Ocean when they think of Delaware's boundary. The I-Team should consider a state boundary data set that includes the outline of the state as popularly envisioned as well as the official state boundary.

Delaware's county boundaries are not subject to any statewide oversight body. The official, legal boundaries of the counties are described in state law (9 Delaware Code, §102 through §104). These descriptions are in often archaic language making reference to movable physical features, such as waterway courses and trees, and to historic property ownership, such as "land formerly of Enoch Jones". The legal description of the boundary between Kent and Sussex Counties (9 Delaware Code, §103) does include several stone monuments, but there is no certainty of the maintenance of these monuments.

As in the case of the State Boundary, it should always be made clear that the GIS representation is not intended to replace the legal description of the county boundaries. At the same time, the I-Team should look for ways to more precisely

delineate the county boundaries. This may tie, in important ways, to the county cadastral data sets.

Governmental Units 2: Municipal Boundaries

Existing Data

The Delaware Framework uses the OSPC Municipal Boundaries data set, which is maintained as part of that Office's work to review and comment on municipal comprehensive plans (29 Delaware Code, § 9103) and on annexations (29 Delaware Code, § 9211). The data set is maintained generally at a scale of 1:12,000, though portions are edited at larger scales. It is available on-line on the Delaware DataMIL and for on-demand download from the OSPC web site (*www.state.de.us/planning/info/munbounds*). Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse. The municipal boundaries are also used in several on-line mapping sites such as the DNREC Environmental navigator and the Thompson Mapping SmartMap sites.

Future Considerations

The advent of complete cadastral coverage of the state, and the upsurge in municipal comprehensive planning have led to frequent updates and corrections to the municipal boundaries data set. The OSPC anticipates continual refinement of this data set.

Governmental Units 3: Other Boundaries

Census geography for Delaware is considered to be a part of the Framework and is available on the DataMIL as well as on the related University of Delaware Census Mapper web site (*www.rdms.udel.edu/census*). The existing census geography (known as TIGER) does not match the Delaware Framework as closely as the I-Team would like and the I-Team is interested in working with the US Census Bureau to realign and correct TIGER. New Castle County, working with the University of Delaware, has already corrected a portion of TIGER. In early 2003, the Census Bureau has released re-aligned TIGER data that was corrected using Delaware's road centerline Framework data set. The Census Bureau has also indicated a desire to use the Delaware Framework Boundary Monument data set to further enhance TIGER.

Senate and Representative District boundaries, published by the Office of the Delaware Elections Commissioner, are based on the TIGER Census geography. They are not yet available on the DataMIL and will need to be corrected to the Framework in the near future.

Elevation

Existing Data

The Delaware Framework includes the USGS 10-foot contour lines from the Digital Line Graph (DLG) data set. The DLG data is taken from the graphic data product of the USGS Topographic Map series. It is at a scale of 1:24,000 and is available on the Delaware DataMIL and through an USGS anonymous FTP site (*ftp://mcsol10.er.usgs.gov/pub/datamil*). Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse.

Future Considerations

An Elevation Working Group of the Delaware I-Team is working on a statewide project to collect higher-resolution elevation data using LIDAR (Light Detection And Ranging). The Working Group includes members from DNREC, OSPC, USGS, the Delaware Geological Survey (DGS) and the USDA Natural Resources Conservation Service (NRCS). This group has issued a Request for Proposals to create a statewide data-gathering program to collect LIDAR data for portions of the state, as funds are available, with a long-term goal of statewide coverage. This data will be used to update state flood maps and should be sufficient to yield higher-resolution contour lines.

Water 1: Water Lines and Areas

Existing Data

The Delaware Framework includes the USGS hydrography lines and areas data sets from the Digital Line Graph (DLG) data set. The DLG data is taken from the graphic data product of the USGS Topographic Map series. It is at a scale of 1:24,000 and is available on the Delaware DataMIL and through an anonymous USGS FTP site (*ftp://mcsol10.er.usgs.gov/pub/datamil*). Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse.

Future Considerations

The I-Team intends to adopt the water line and area data from the USGS National Hydrography Dataset (NHD) by hydrologic cataloguing unit (CU). This dataset is under development by the USGS at a national level. The NHD is a combination of elements of the DLG data and the EPA Reach File (RF3) data. It provides a comprehensive digital spatial data model that contains information about surface hydrologic features such as lakes, ponds, streams, rivers, springs, and wells.

Delaware is covered by all or parts of seven CU's. NHD updates have been completed for CU's that cover parts of the state in the north and are expected to be complete soon for CU's that cover parts of the western portion of the state. USGS has undertaken an NHD update for the CU that covers much of the rest of the state. This project is funded in part by DNREC. The remaining portion of the state would be covered by an NHD update of a CU that is mostly in Maryland. The I-Team continues to track plans for an update of that CU with the USGS.

Water 2: Watersheds

Existing Data

The Framework uses a set of watershed boundaries developed by the DNREC Watershed Assessment Branch in 1998. This data set is generally at a scale of 1:12,000 and is available on-line for browsing and download on the Delaware DataMIL and the DNREC Environmental Navigator. Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse.

Future Considerations

There are several efforts under way nationally and locally to update watershed boundaries. The Environmental Protection Agency (EPA) has an effort under way to delineate 5th and 6th order watersheds using a 30-meter Digital Elevation Model (DEM). The Delaware Geological Survey (DGS) has been working in the Inland Bays area to delineate 5th, 6th, and sub-6th order watersheds. The USDA's NRCS has also been working to create an updated delineation of watersheds at the 6th order level for Delaware.

A Delaware Watershed Delineation Colloquium, including representatives from all groups interested in watershed delineations in Delaware, met in Dover in July of 2002 and agreed to choose one set of watershed boundaries and unite behind those as part of the Delaware Spatial Data Framework. The group agreed to use the 6th order boundaries from the local NRCS office and use federal and local experts to peer-review and "bless" those watersheds and submit them to the I-Team for consideration.

The Delaware I-Team will need to pursue adoption of those boundaries in 2003 and will need to consider how well they match boundaries delineated by neighboring states.

Transportation

Existing Data

The Delaware Framework uses road centerline files published by the Delaware Department of Transportation (DelDOT) to represent the state's roadway network and the railroad network. These files are at a scale of 1:12,000 and generally match the 1997 orthoimagery. The centerline files are available on-line for browsing and download on the Delaware DataMIL and for download from the DelDOT web site (*www.deldot.net/static/pubs_forms/GIS/centerline*). Metadata for this data set has been published on the Delaware Spatial Data Clearinghouse.

Future Considerations

The Delaware I-Team is actively exploring a new approach to providing a transportation network data set for the Delaware Framework. The Delaware Department of Transportation and the three counties are working together, as a Cadastral/Transportation Working Group under the I-Team, to forge a

partnership that would combine the county cadastral data, which shows road rights-of-way with DelDOT's expanded road segment attribute data. The Working Group will also have to consider issues around those transportation-related data items now found in the USGS Topographic Map series that are not reflected in Delaware's existing transportation data set.